

Docket No.: 255861US0PCT

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

IN APPLICATION OF: :  
Xavier FANTON, et al. : EXAMINER: BRAYTON, JOHN  
SERIAL NO.: 10/502,052 :  
FILED: JANUARY 7, 2005 : GROUP ART UNIT: 1795  
FOR: NON-STOICHIOMETRIC NIOX CERAMIC TARGET

**DECLARATION UNDER 37 C.F.R. 1.132**

COMMISSIONER FOR PATENTS  
ALEXANDRIA, VA 22313

SIR:

I, Xavier FANTON, hereby declare:

1. I am employed by Saint-Gobain as an engineer and have experience in the field of measuring and analyzing physical properties of coatings.

2. I have been asked to explain how spray coating an essentially ceramic target for a magnetically enhanced sputtering device, where the target contains predominantly nickel oxide  $\text{NiO}_x$  which is oxygen-deficient with respect to the stoichiometric composition  $\text{NiO}$ , results in an improved target having improved properties and/or characteristics. In brief, spray coating allows formation of targets having much higher densities (lower porosity) than pressing and sintering, resulting in improved targets.

3. It has been our experience at Saint-Gobain that pressing and sintering a target contains predominantly nickel oxide results in a target having a density of 75%-85%.

4. In contrast, it has been our experience at Saint-Gobain that spray coated targets containing predominantly nickel oxide generally have much higher density, for example 95%-97% density. A specific example of this is attached at Tab A which depicts the porosity

of a NiOx topcoat which had been spray coated on a bondcoat which had been deposited on a backing tube. As can be seen in Tab A, the porosity was 3.8%, corresponding to roughly 96% density.

5. Targets having higher density (i.e lower porosity) have improved properties as compared to targets having lower density, including but not limited to improved performance characteristics -- before sputtering, during vacuuming, lower porosity implies less impurities have been adsorbed when in contact with the air before the vacuuming step and thus a quicker degassing in the vacuum chamber; also, during sputtering, higher porosity increases the apparition of micro arcs at the surface of the target, which means a lower stability of the process as well as accelerated aging of the target; having higher density targets minimizes these drawbacks.

6. The undersigned petitioner declares further that all statements made herein of his own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of this application or any patent issuing thereon.

7. Further deponent sayeth not.

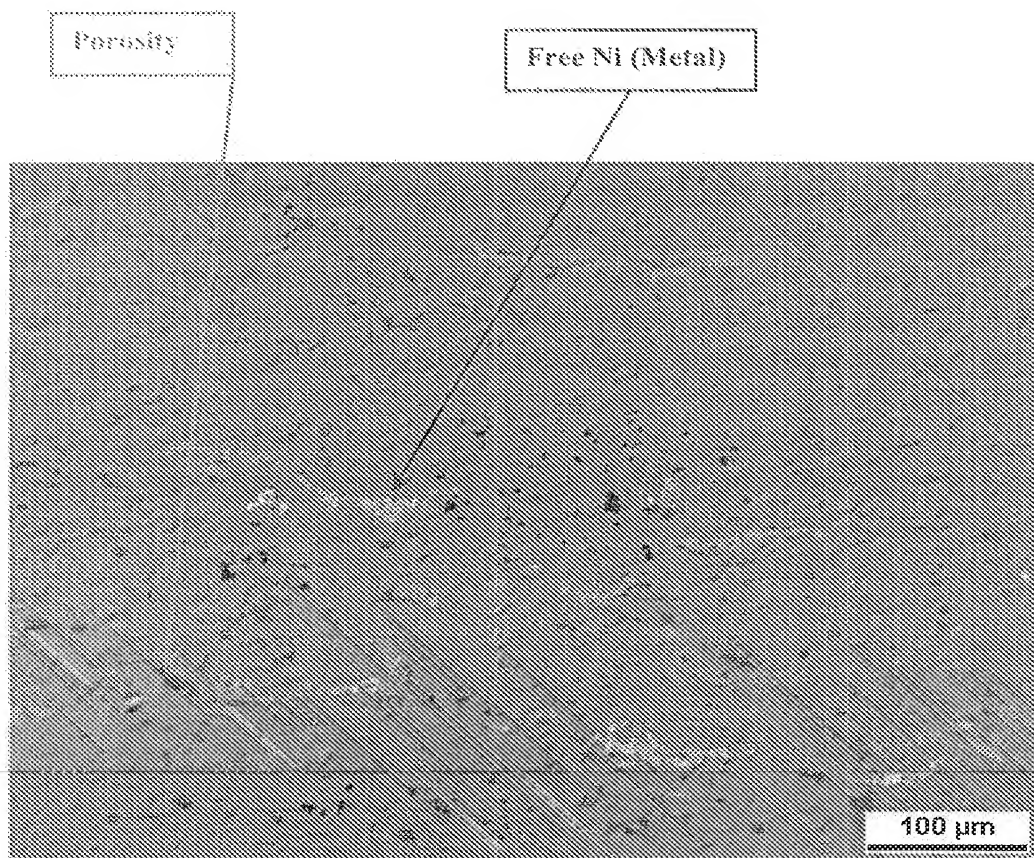
Xavier FANTON  
Name

  
Signature

August 23<sup>rd</sup>, 2011  
Date

# **TAB A**

**MICROSTRUCTURE**



A rough estimation by image analysis shows the following results :

Feature	Porosity	Free Nickel
Measurement by image analysis	3,8 % (vol %)	4,5% (converted in weight %)